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| APPLICATION NO.  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.               | CONFIRMATION NO.       |
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| 10/807,472   | 03/24/2004  | Osamu Nakamura       | 740756-2722                       | 2927                   |
| 22204  | 7590        | 01/07/2008           |                                   |                        |
| NIXON PEABODY, LLP<br>401 9TH STREET, NW<br>SUITE 900<br>WASHINGTON, DC 20004-2128 |             |                      | EXAMINER<br>DHINGRA, RAKESH KUMAR |                        |
|  |             |                      | ART UNIT<br>1792                  | PAPER NUMBER           |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |  |  |
|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/807,472 | <b>Applicant(s)</b><br>NAKAMURA, OSAMU |  |
|                              | <b>Examiner</b><br>Rakesh K. Dhingra | <b>Art Unit</b><br>1792                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 October 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☒ Claim(s) 38 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/14/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/12/07 has been entered.

### ***Claim Objections***

Claim 38 is objected to because of the following informalities:

Line 2 – limitation “a second” is repeated and needs to be deleted.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1) Claims 5-9, 39 recite the limitation “the plurality of plasma generation units” in line 2”. There is insufficient antecedent basis for this limitation in the claims. For the purpose of examination on merits, this limitation has been interpreted as “plurality of second electrodes”.

### ***Response to Arguments***

Applicant's arguments with respect to claim 1-37 have been considered and response is given hereunder.

Applicant has added new claims 38-44.

Claims 1-44 are now pending and active.

Art Unit: 1792

Regarding Claims 1-3, 24 and 31 - applicant argues that in Gianchandani reference, gas is not blown between the first and second electrodes, as claimed and the reference is silent with regard to blowing a gas between the region beneath electrode segments 51, 52 and above substrate 17, and therefore the claims are not anticipated under 35 USC 102.

Examiner responds that Gianchandani et al teach gas from gas source 13 is introduced (blown) between substrate 17 (like first electrode) and second electrodes 51, 52 and plasma is generated within openings 24 in dielectric plate 24 (between first and second electrodes 26, 17). Gianchandani et al also teach that ingress of gas in the openings 24 (space between first and second electrodes 26, 17) can be obtained through laterally extending micro-channels (not shown) in the dielectric layer 22 {Fig. 1 and col. 6, lines 6- 35}[that is gas is blown in a space between the first electrode and the plurality of second electrodes]. Thus Gianchandani et al explicitly teach blowing a process gas into a space between the first and plurality of second electrodes as per claim limitations and the claims 1-3, 24 and 31 have been rejected under 35 USC 102 (b) as explained below. Balance claims 4-23, 25-30 and 32-37 have also been rejected as explained below. Further, new claims 38-44 have also been rejected as explained below.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 7, 10, 13, 16, 19, 24-29, 31-36 and 38-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).**

Regarding Claims 1, 31: Gianchandani et al teach a plasma apparatus comprising:

a plasma generation unit comprising a substrate 17 (as a first electrode) and electrode elements 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for blowing (introducing) a process gas into a space between the first electrode 17 and the plurality of second electrodes 51, 52 {the plasma is generated between the electrode segments and the substrate 17 due to dissociation of gas blown in these openings and by the voltage applied from a power supply}. Gianchandani et al also teach that ingress of gas in the openings 24 (space between first and second electrodes 26, 17) can be obtained through laterally extending micro-channels (not shown) in the dielectric layer 22 [that is gas is blown in a space between the first electrode and the plurality of second electrodes]; and.

a power supply unit 31 for applying a voltage independently (selectively) to at least one electrode among the plurality of second electrodes 51 and 52, wherein

the plurality of second electrodes 51, 52 of the plasma generation unit are arranged linearly in one line (for example, Fig. 1-3 and col. 2, lines 40-65 and col. 5, line 25 to col. 7, line 35).

Regarding Claims 7, 32: Gianchandani et al teach all limitation of the claim including that plurality of second electrodes 51, 52 are arranged linearly and that voltage can be independently (selectively) applied to the various second electrodes 51, 52. Gianchandani et al also teach that electrode segments (plurality of second electrodes 51, 52) may be selectively moved with the help of holder 54 (Figure 3), around substrate area and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35).

Regarding Claims 10, 33: Gianchandani et al teach that plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Regarding Claims 13, 34: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 are covered with dielectric 22 (Fig. 1).

Regarding Claims 16, 35: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claims 19, 36: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode (can be pre-determined electrode since voltage can be supplied independently to various electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

Regarding Claim 24: Gianchandani et al teach all limitations of the claim (as already explained above under claim 1) and further including using a single large electrode opposite a substrate with a patterned mask thereon (plasma generating unit comprising a first electrode and a plurality of second electrodes). Gianchandani et al also teach that ingress of gas in the openings 24 (space between first and second electrodes 26, 17) can be obtained through laterally extending micro-channels (not shown) in the dielectric layer 22 [that is gas is blown in a space between the first electrode and the plurality of second electrodes]. Gianchandani et al further teach that multiple plasma processes can be established simultaneously using two different precursor gases (plurality of plasma generation units). Gianchandani et al also teach that micro-plasmas like 81, 82 can be formed to be spatially separated from one another and act independently on the substrate 17 (for example, Fig. 6 and col. 2, lines 1-40 and col. 10, line 30 to col. 11, line 55).

Regarding Claim 25: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52 (like plurality of plasma generators). Gianchandani et al also teach that electrode segments (plurality of second electrodes) may be selectively moved around substrate

Art Unit: 1792

area any of plurality of second electrodes 51, 52 and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35).

Regarding Claim 26: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Regarding Claim 27: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Fig. 1).

Regarding Claim 28: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claim 29: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

Regarding Claim 38: Gianchandani et al teach a plasma apparatus comprising:

a plasma generation unit comprising a first electrode 26 and a plurality of second electrodes 71 opposed to the first electrode (Gianchandani et al also teach the upper electrode can be a single large electrode, and different plasmas can also be established at spatially separated regions of the substrate);

a gas supply unit 13 for blowing a process gas through a first space and a second space continuously, the first space being between the first electrode 26 and a substrate 17 (through the openings 27, 24 and 72) and the second space being between the plurality of second electrodes 71 and the substrate 17 (through openings 72) Gianchandani et al also teach that ingress of gas in the openings 24 can be obtained through laterally extending micro-channels (not shown) in the dielectric layer 22; and

a power supply unit 31 for applying a voltage independently (selectively) to at least one electrode among the plurality of second electrodes 51 and 52, wherein

the plurality of second electrodes 51, 52 of the plasma generation unit are arranged linearly in one line (for example, Fig. 1-3 and col. 2, lines 1-65 and col. 5, line 25 to col. 7, line 35 and col. 9, line 50 to col. 10, line 48).

Regarding Claim 39: Gianchandani et al teach that plurality of second electrodes (similar to electrode segments 51, 52) may be selectively moved with the help of holder 54 (Fig. 3), around substrate area and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

Regarding Claim 40: Gianchandani et al teach that plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Regarding Claim 41: Gianchandani et al teach electrodes 26, 71 are covered with dielectric 22 (Fig. 1).

Regarding Claim 42: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claim 43: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode (similar to electrodes 51, 52) and synchronizing the movement with application of voltage to at least on electrode (can be pre-determined electrode since voltage can be supplied independently to various electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter



sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-6, 8, 9, 11, 12, 14, 15, 17, 18, 20-23 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870) in view of Morfill et al (US Patent No. 6,777,880).**

Regarding Claims 2, 3: Gianchandani et al teach all limitations of the claim (as explained above under claim 1) and further teach plasma apparatus (Figures 1-3) comprising:

a plasma generation unit comprising a substrate 17 (first electrode) and a electrodes 51, 52 (plurality of second electrodes) opposed to the first electrode 17;

a gas supply unit 13 for introducing (blowing) a process gas into a space between the first electrode 26 and the plurality of second electrodes (openings 24 in dielectric layer 22) {the plasma is generated in the openings 24 due to dissociation of gas blown in between the electrodes 17 and 51, 52 by the voltage applied from a power supply}[claim 1 does not recite that gas is blown “directly” into a space between the first electrode and the plurality of second electrodes]; and

a power supply 31 unit for selectively applying a voltage to at least one electrode among the plurality of second electrodes 51, 52,

the plurality of second electrodes of the plasma generation unit are arranged linearly in one line (col. 2, lines 40-65 and col. 5, line 25 to col. 7, line 35).

Gianchandani et al further teach (Figure 8) that size and spacing of electrodes may be selected as per type of treatment required like anisotropic etch or isotropic etch etc (column 7, lines 15-30 and column 12, lines 5-30), but does not explicitly teach specific size of second electrode.

Art Unit: 1792

Morfill et al teach a plasma apparatus (Figures 1-6) comprising a segment electrode 11 with electrode segments 113 and a second electrode 112. Morfill et al further teach grid size of segmented electrode to be 1.27mm (as against claim size of 1 mm). Morfill et al also teach that size and spacing of electrode segments is application dependent (col. 9, lines 10-68).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select size of second electrodes as taught by Morfill et al in the apparatus of Gianchandani et al as per type of process treatment required.

Regarding Claim 4: Gianchandani et al teach all limitations of the claim except pattern is a wiring pattern, which is an intended use. Since the prior art apparatus meets all structural limitations of the claim, the apparatus is considered capable of meeting this intended use limitation.

In this connection courts have ruled:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Regarding Claims 5, 6: Gianchandani et al teach a holder 54 that enables movement of second electrodes 51, 52 with respect to substrate 16 (Fig. 3 and col. 7, lines 1-5).

Regarding Claims 8, 9: Gianchandani et al teach that voltage can be independently (selectively) applied to various second electrodes 51, 52. Gianchandani et al also teach that electrode segments (plurality of second electrodes) may be selectively moved around substrate area any of plurality of second electrodes 51, 52 and voltages applied independently for different lengths of time to obtain desired etching/deposition at different locations on the substrate (that is synchronization of movement and application of voltage to second electrodes) [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35).

Regarding Claims 11, 12: Gianchandani et al teach plurality of second electrodes are formed using lithography techniques (Fig. 5 and col. 10, lines 15-25).

Art Unit: 1792

Regarding Claims 14, 15: Gianchandani et al teach first electrode 17 and plurality of second electrodes 51, 52 covered with dielectric 22 (Fig. 1).

Regarding Claim 17: Gianchandani et al teach the apparatus is used for etching or deposition (col. 2, lines 50-60).

Regarding Claims 18, 22, 23, 37: Gianchandani et al teach that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr). It would be obvious to select operating pressure as other process limitations like gases, material to be etched /deposited and voltages etc (col. 8, lines 5-15).

Regarding Claims 20, 21: Gianchandani et al teach all limitations of the claim including moving of holder 54 for relative motion between substrate 17 (stage) and the at least one electrode 51, 52 and synchronizing the movement with application of voltage to at least on electrode [col. 2, line 40 to col. 3, line 20 and col. 6, line 60 to col. 7, line 35].

**Claims 30, 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gianchandani et al (WO 01/27969, which is equivalent to US Patent No. 6,827,870).**

Regarding Claim 30: Gianchandani et al teach all limitations of the claim (as already explained above under claim 1) and further that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr) [col. 8, lines 5-15].

It would be obvious to select operating pressure (functional limitations) as per intended use limitations like type of gases use and material to be etched/deposited.

In this connection courts have ruled:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

Art Unit: 1792

Regarding Claim 44: Gianchandani et al teach all limitations of the claim (as already explained above under claim 1) and further that typical operating pressure can range from 1-1000 torr (as against claimed pressure of 1 atm = 760 torr) [col. 8, lines 5-15].

It would be obvious to select operating pressure (functional limitations) as per intended use limitations like type of gases use and material to be etched/deposited.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rakesh K. Dhingra whose telephone number is (571)-272-5959. The examiner can normally be reached on 8:30 -6:00 (Monday - Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571)-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Rakesh K. Dhingra



Karla Moore  
Primary Examiner  
Art Unit 1792